



EPA Region 7 TMDL Review

TMDL ID: LP1-L0250

State: NE

Document Name: FREMONT LAKE #20

Basin(s): MISSOURI - LOWER PLATTE

HUC(s):

Water body(ies):

Tributary(ies): NONE

Pollutant(s): NUTRIENTS

Submittal Date: 6/26/2007

Approved: Yes

Submittal Letter

State submittal letter indicates final Total Maximum Daily Load(s) (TMDL) for specific pollutant(s)/water(s) were adopted by the state, and submitted to EPA for approval under section 303(d) of the Clean Water Act [40 CFR § 130.7(c)(1)]. Include date submitted letter was received by EPA, date of receipt of any revisions, and the date of original approval if submittal is a phase II TMDL.

The TMDL was officially submitted by the State of Nebraska in a letter dated June 22, 2007 and received by EPA on June 26, 2007. A revised version of the TMDL was submitted by an e-mail attachment received by EPA on July 23, 2007.

Water Quality Standards Attainment

The water body's loading capacity (LC) for the applicable pollutant is identified and the rationale for the method used to establish the cause-and-effect relationship between the numeric target and the identified pollutant sources is described. TMDL and associated allocations are set at levels adequate to result in attainment of applicable water quality standards (WQS) [40 CFR § 130.7(c)(1)]. A statement that WQS will be attained is made.

The LC for this TMDL is defined as the amount of phosphorus Fremont #20 can receive on an average annual basis and still meet the applicable in-lake water quality target. Phosphorus reduction is targeted to lower the trophic state of the lake which should have the effect of reducing the quantity of blue-green algae which produce algal toxins. Target phosphorus concentrations and loads are related through the use of the Canfield-Bachman natural lake model. The target average phosphorus concentration for Fremont #20 is 47 ug/L which should be achieved with an average annual load of 120 pounds per year. This will require a load reduction of approximately 86%. When this reduction is accomplished, water quality standards should be achieved.

Numeric Target(s)

Submittal describes applicable WQS, including beneficial uses, applicable numeric and/or narrative criteria. If the TMDL is based on a target other than a numeric water quality criterion, then a numeric expression, site specific if possible, was developed from a narrative criterion and a description of the process used to derive the target is included in the submittal.

Fremont #20's beneficial uses are Primary Contact Recreation, Aquatic Life (warm water class A), Agriculture Water Supply (class A) and aesthetics. The impaired use targeted by this TMDL is Primary

Contact Recreation, it is impaired because of excessive algal toxins. There is no numeric water quality standard for algal toxins, the numeric target was determined by state agencies to address conditions considered safe for primary contact recreation. Phosphorus was targeted to reduce algal toxin (microcystin) concentrations to 20 ug/L or lower. This linkage is defined through the trophic state index method (TSI) which relates algal biomass to phosphorus concentrations. This target phosphorus concentration is 47 ug/L.

Pollutant(s) of concern

An explanation and analytical basis for expressing the TMDL through surrogate measures (e.g., parameters such as percent fines and turbidity for sediment impairments, or chlorophyll-a and phosphorus loadings for excess algae) is provided, if applicable. For each identified pollutant, the submittal describes analytical basis for conclusions, allocations and margin of safety (MOS) that do not exceed the LC. If submittal is a phase II TMDL there are refined relationships linking the load to WQS attainment. If there is an increase in the TMDL there is a refined relationship specified to validate the increase in TMDL (either load allocation (LA) or waste load allocation (WLA)). This section will compare and validate the change in targeted load between the versions.

Algae toxins are the result of increased algae densities. Algae densities are the response to the nutrients available within the water body. To address the impairment, algae densities must be controlled, which is best accomplished through the reduction of nutrients. Therefore, this TMDL will focus on phosphorus as the pollutant of concern to address the algal toxin impairment.

Source Analysis

Important assumptions made in developing the TMDL, such as assumed distribution of land use in the watershed, population characteristics, wildlife resources, and other relevant information affecting the characterization of the pollutant of concern and its allocation to sources, are described. Point, nonpoint and background sources of pollutants of concern are described, including magnitude and location of the sources. Submittal demonstrates all significant sources have been considered. If this is a phase II TMDL any new sources or removed sources will be specified and explained.

Nonpoint and natural sources of nutrients have been identified as the cause of impairment to Fremont Lake #20. Nonpoint phosphorus sources identified in the Fremont #20 watershed include: bank erosion; groundwater inflow; and deposition and decomposition of vegetative material from the surrounding landscape.

No point sources, permitted under the National Pollutant Discharge Elimination System (NPDES) program has been identified in the Fremont #20 watershed.

Natural background phosphorus can be attributed to precipitation events, however, natural sources were not separated from the nonpoint source contribution.

It seems all significant sources have been identified.

Allocation - Loading Capacity

Submittal identifies appropriate WLA for point, and load allocations for nonpoint sources. If no point sources are present the WLA is stated as zero. If no nonpoint sources are present, the LA is stated as zero [40 CFR § 130.2(i)]. If this is a phase II TMDL the change in LC will be documented in this section.

The TMDL does set a total phosphorus allocation of 120 lbs/year. To translate the long term average to maximum daily values EPA Region 7 has suggested the approach described in the Technical Support Document for Water Quality Based Toxics Control (EPA/505/2-90-001) (TSD). The maximum daily load (MDL) equals the long term average (LTA) * $\exp(z \cdot \sigma - 0.5 \cdot \sigma^2)$. The data used in the TMDL has a coefficient of variation (CV) of 0.3. From the TSD, the 99th percentile occurrence probability for a CV of 0.3 is 1.9. Using these assumptions, the MDL = LTA*1.9. This results in a daily expression of 0.662 lbs/day.

WLA Comment

Submittal lists individual WLAs for each identified point source [40 CFR § 130.2(h)]. If a WLA is not assigned it must be shown that the discharge does not cause or contribute to WQS excursions, the source is contained in a general permit addressed by the TMDL, or extenuating circumstances exist which prevent assignment of individual WLAs. Any such exceptions must be explained to a satisfactory degree. If a WLA of zero is assigned to any facility it must be stated as such [40 CFR § 130.2(i)]. If this is a phase II TMDL any differences in phase I and phase II WLAs will be documented in this section.

The wasteload allocation for this TMDL will be zero.

LA Comment

Includes all nonpoint sources loads, natural background, and potential for future growth. If no nonpoint sources are identified the LA must be given as zero [40 CFR § 130.2(g)]. If this is a phase II TMDL any differences in phase I and phase II LAs will be documented in this section.

The phosphorus load allocation distributed among the nonpoint and natural sources is 108 pounds per year (0.56 pounds per day).

Margin of Safety

Submittal describes explicit and/or implicit MOS for each pollutant [40 CFR § 130.7(c)(1)]. If the MOS is implicit, the conservative assumptions in the analysis for the MOS are described. If the MOS is explicit, the loadings set aside for the MOS are identified and a rationale for selecting the value for the MOS is provided. If this is a phase II TMDL any differences in MOS will be documented in this section.

An explicit 10% margin of safety will be defined for this TMDL. Therefore the margin of safety is 12 lbs/year (0.06 pounds/day).

Seasonal Variation and Critical Conditions

Submittal describes the method for accounting for seasonal variation and critical conditions in the TMDL (s) [40 CFR § 130.7(c)(1)]. Critical conditions are factors such as flow or temperature which may lead to the excursion of WQS. If this is a phase II TMDL any differences in conditions will be documented in this section.

The pollutant of concern is delivered on a year round basis and the assessment of the data considers recreational season and annual average conditions.

The critical condition for algal toxins is the recreation season of May 1 through September 30.

The "critical condition" for which the nutrient portion of this TMDL applies is the entire year. Although the April-October growing season data is utilized, the loading to meet the conditions is an annual load. This approach takes into consideration that nutrients being lost from the water column and trapped in bottom sediments have the potential to re-enter the water column at a later time.

Public Participation

Submittal describes required public notice and public comment opportunity, and explains how the public comments were considered in the final TMDL(s) [40 CFR § 130.7(c)(1)(ii)].

The availability of the TMDL in draft form was published in the Fremont Tribune with the public comment period running from May 14, 2007 to June 18, 2007. These TMDLs were also made available to the public on the NDEQ's Internet site and interested stakeholders were informed via

email of the availability of the draft TMDL. No comments on the TMDL were received.

Monitoring Plan for TMDL(s) Under Phased Approach

The TMDL identifies a monitoring plan that describes the additional data to be collected to determine if the load reductions required by the TMDL lead to attainment of WQS, and a schedule for considering revisions to the TMDL(s) (where phased approach is used) [40 CFR § 130.7].

Monitoring of Fremont #20 will be conducted in the future to determine if the water quality is improving, degrading or remaining status quo. Specifically, the NDEQ will coordinate weekly monitoring of the swimming beach for algal toxins (microcystin) concentration. In-lake monitoring will also be conducted to determine if the alum treatment was successful at reducing and maintaining the in-lake, growing season total phosphorus at a level below the applicable water quality criteria.

Reasonable Assurance

Reasonable assurance only applies when less stringent WLAs are assigned based on the assumption of nonpoint source reductions in the LA will be met [40 CFR § 130.2(i)]. This section can also contain statements made by the state concerning the state's authority to control pollutant loads.

Because no nonpoint source reductions are required to account for lack of NPDES load reductions, no reasonable assurances are required. However, the submittal lists nonpoint source authorities and opportunities which may result in the implementation of nonpoint source reductions; "Effective management of nonpoint source pollution in Nebraska necessarily requires a cooperative and coordinated effort by many agencies and organizations." To address the phosphorus and algal toxin impairments in Fremont #20 the NDEQ has partnered with the Nebraska Game and Parks Commission and the University of Nebraska-Lincoln to collectively prepare an implementation plan.

As well, the Department has identified the Fremont #20 project as a high priority for receipt of CWA Section 319 grant monies."